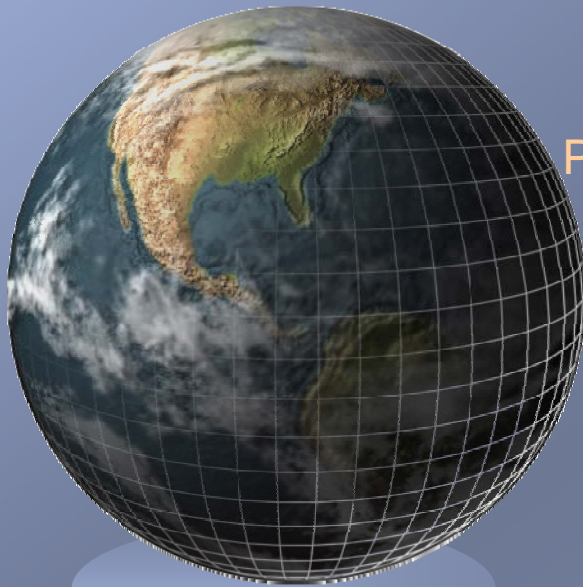


# Geoscience Education Opportunities: Partnerships to Advance Teaching & Scholarship (GEOPATHS)

An NSF GeoEd funded Initiative

Presentation at the GLOBE Annual Conference  
San Antonio, Texas USA  
August 2<sup>nd</sup>, 2007



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(Department of Geosciences)

**Elizabeth Stoddard** (Department of Physics)

**Louis Odom** (School of Education)

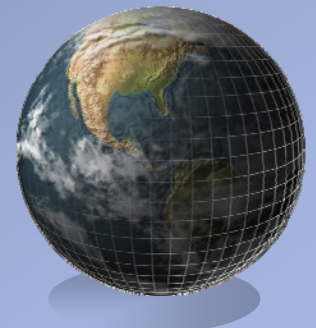
University of Missouri-Kansas City

**David Ketchum** (Science Coordinator)

Kansas City Missouri School District

# The UMKC GLOBE Partnership

- Partnership officially began in January 2005
- Partnership is housed in the Dept. of Geosciences
- Partnership currently supported by two grants: A 1-year Improving Teacher Quality (ITQ) grant from the Missouri Dept. of Higher Education and a 4-year grant from the NSF Geosciences Education Directorate
- Conducted two PD Institutes so far with 41 teachers trained on various GLOBE Air, Hydro & Surface Temp. Protocols
- 25 new GLOBE schools established.



# The NSF GEOPATHS Project

GeoEd Opportunities: Partnerships to Advance Teaching & Scholarship

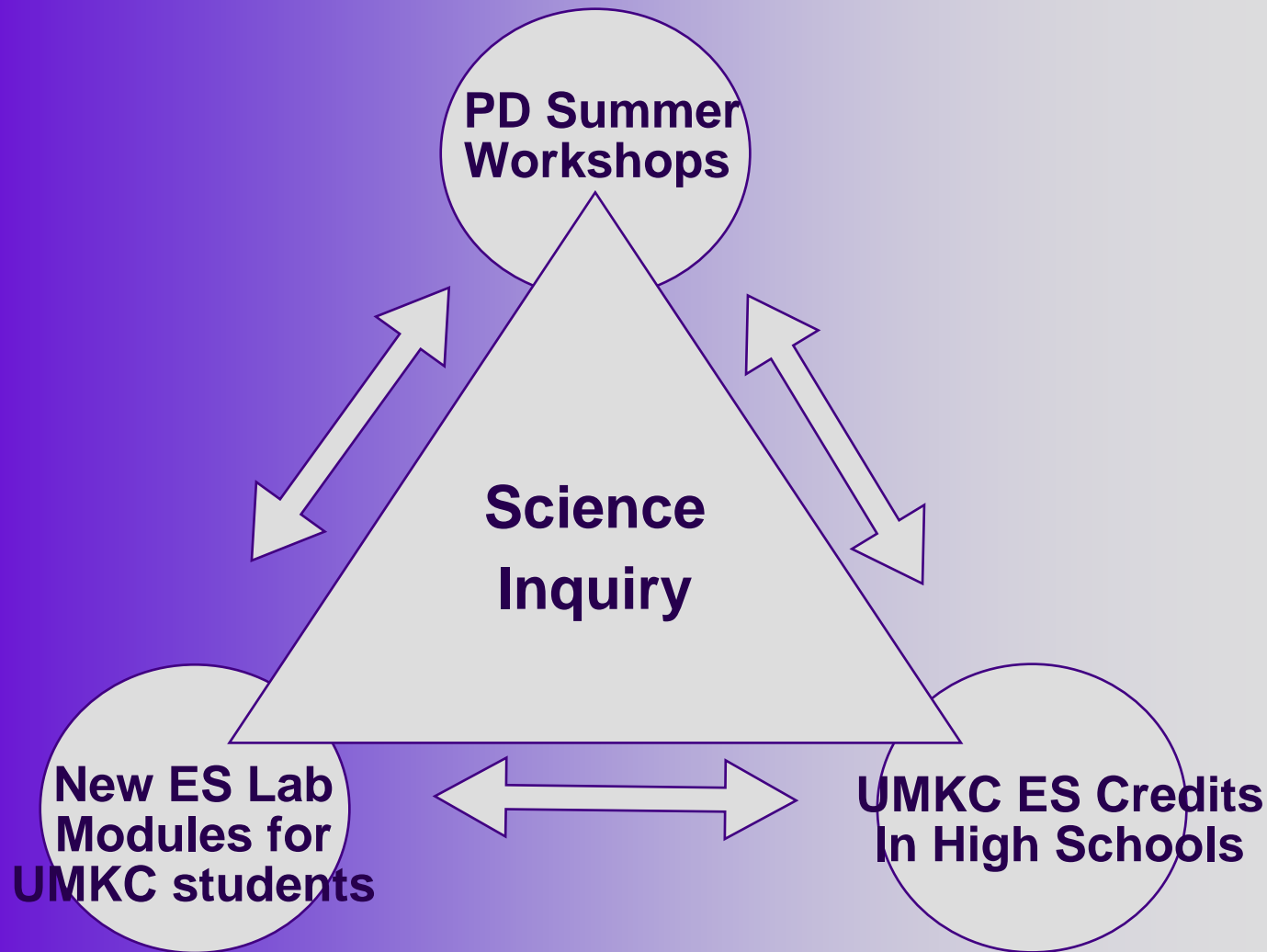
4-year program to:

- Increase Kansas City MO School District (KCMSD) high school teachers' knowledge content of geosciences & the use inquiry in classroom instruction via specialized Professional Development (PD).
- Expand opportunities for KCMSD students to receive college credits in high school
- Enhance student awareness of careers in the geo and Environmental Sciences
- Boost the number of underrepresented minorities entering geosciences fields at UMKC & other Missouri 4-year colleges



# The NSF GEOPATHS Project

PD Implementation Strategy: Connect K-12 to Higher Ed. via Science Inquiry



# Enhancing the College Freshman Science Experience with GLOBE Inquiry

- Env. Science 110R is an Intro Level Environmental Science Course taught every semester at UMKC
- The course is a popular course for non science majors to meet their science lecture and laboratory credit requirement
- We redesigned the 2 credit laboratory section and incorporated several GLOBE protocols
- We tested the new labs last semester exclusively with Pre-service teachers from the UMKC Institute of Urban Education
- We used some of the materials in the PD Institute for 21 high school science teachers this summer (July 9-27, 2007)



# The GEOPATHS PD Institute

## Program Components

- Two-year PD program with the following elements: Intensive 3-week summer workshops in 2007 & 2008; follow-up implementation period during fall semesters following each summer workshop.
- Participants can earn up to 18 graduate credits over the two year period, qualifying them to participate in the UMKC College Credits in High School Program.
- Curriculum is based on the 5E model & the Concept Mapping Approach. Emphasis Areas: Year 1 - **Our Changing Atmosphere**; Year 2 - **Our Dynamic Earth**.
- Each year PD participants and their students will produce a “Kansas City State of Our Environment Report” based on student atmosphere & Hydrology investigations during the fall semester.
- PD program external evaluator: Dr. Marilyn Rhea from NWMSU.



# The GEOPATHS PD Institute

## Our Partner School District: Kansa City Missouri SD

- KCMSD is the second largest school district in the Missouri
- It is an urban school district with 78 % minority student enrollment. Low student achievement & HS graduation rates
- 72% of science teachers in the KCMSD have a bachelor's and/or master's degree in a science field
- 70% of science teachers are not certified by the state of Missouri to teach the classes they are currently teaching
- 72% of teachers do not feel prepared enough to teach the new Grade Level Expectations (GLEs) developed by the district.
- 30% of the high school science curriculum defined in the GLEs is geoscience content, including the entire second semester of the 9th grade science curriculum.



# The GEOPATHS PD Institute

## Program Participants



# The GEOPATHS PD Institute

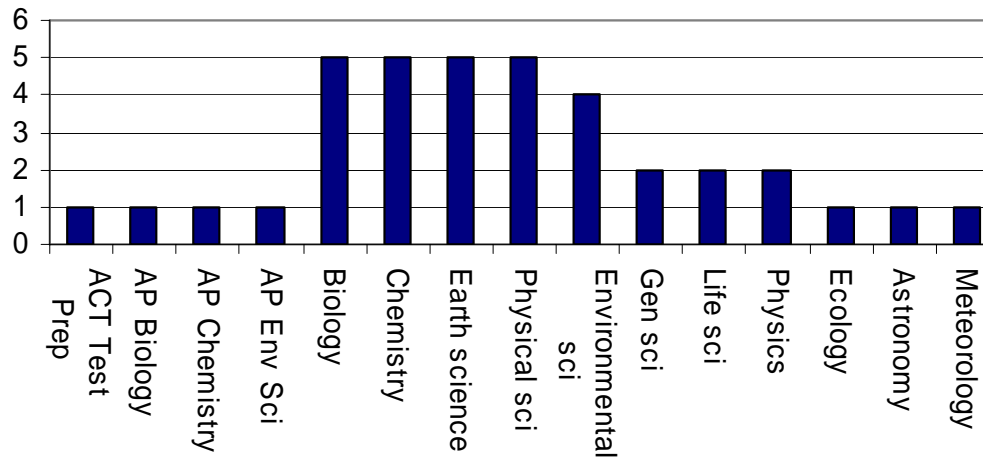
## In-class & field investigations and explorations



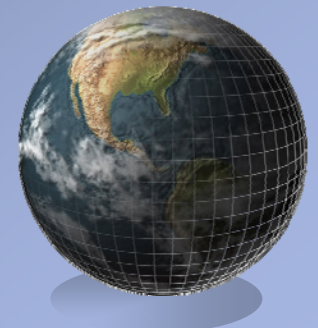
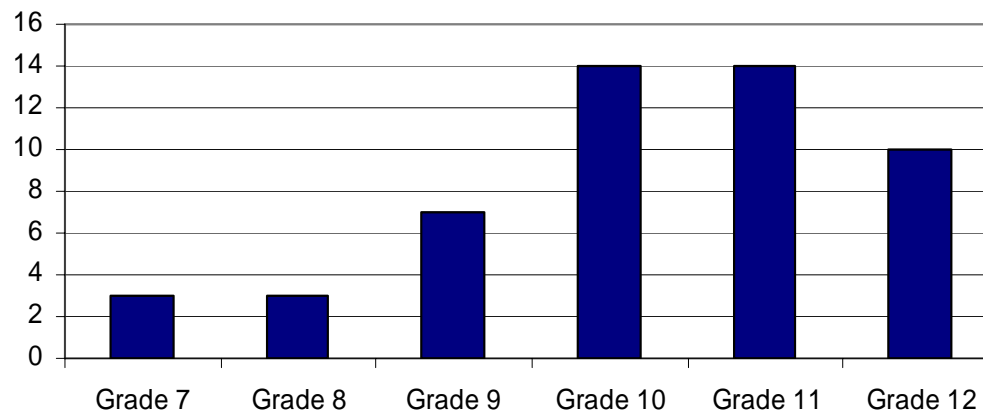
# The GEOPATHS PD Institute

## Participants Profile

**Subjects Taught**



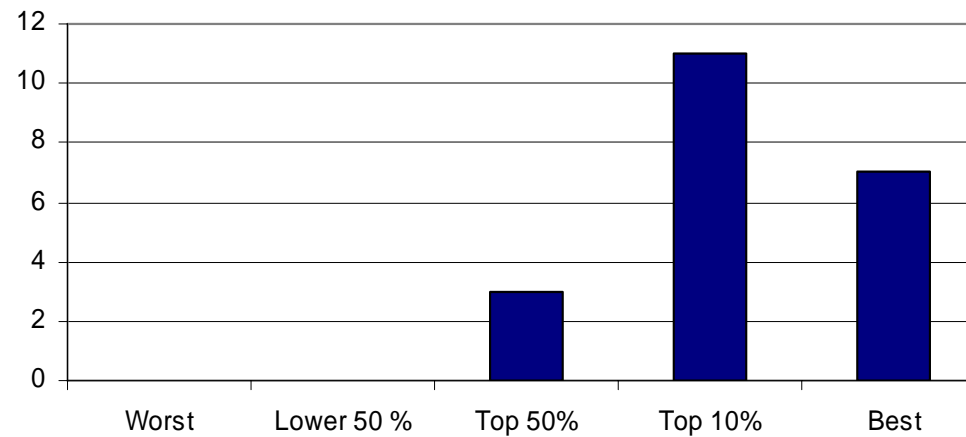
**Grade Levels Taught**



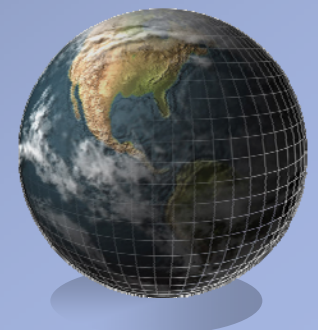
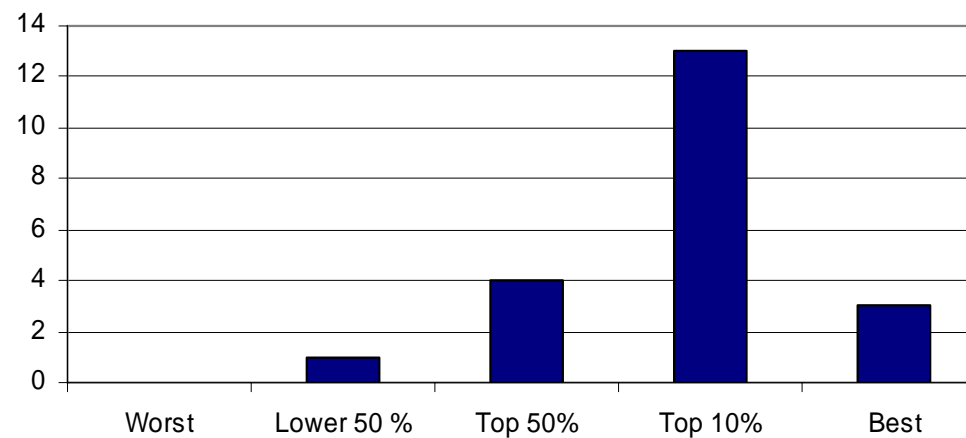
# The GEOPATHS PD Institute

## Participants Post-workshop Feedback/Assessment

**Ranking of Workshop Instructional Benefits**



**Ranking of Workshop Organization**



# The GEOPATHS PD Institute

## Participants Post-workshop Reflections

- Working with real scientists and forming relationships with them. Seeing the learning cycle in action and having it modeled for us. Getting all the great lessons. Field trips that expanded my view of science. I liked the incorporation of technology.
- That I can take what I learned and apply it directly and immediately in my classroom.
- The simple applicable hands-on activities followed by time for processing the learning cycle and concept mapping. Field trips. The ability to network and build relationships with other teachers.



# The GEOPATHS PD Institute

## Participants Post-workshop Reflections

- Pre- and post-tests
- The heat and humidity.
- There were organization and communication problems between instructors. No overall place to turn things in.
- A little too much content pushed through too fast. The day after the field trip should have been a day to pull things together; instead three more lessons shoved down our throats.



# Conclusion

- GEOPATHS is 4-year project and impact will be demonstrated via formative and summative assessments by our contracted external evaluator and through internal assessment.
- The post workshop reflections of the teachers demonstrate very positive early impact.
- The GEOPATHS model of collaboration between a large urban school district and an urban university to address achievement gap issues could be a national model.



# Conclusion

“This project stands above others this evaluator has visited in its implementation of a true partnership between the partner school district – KC – 33 and UMKC. The working relationship between the two entities already existed before they responded to the DHE RFP and because the project only worked with teachers from a single school district, they were able to design a summer institute curriculum for the particular needs of science elementary and middle school teachers in this district (as defined by the science and math coordinators for the district).”

- Dr. Rose Marra UM-Columbia

Member, MDHE ITQ External Evaluation Team

